Claims

1. Method for the immobilization of mediator molecules on implant materials, characterized in that in a first step anchor molecules are covalently bound to the surface of the implant material, wherein these anchor molecules have functional groups to which further chemical compounds can be covalently bound, and in a second step mediator molecules can be immobilized on the implant material via these functional groups.

2. Method according to claim 1, characterized in that in an intermediate step between the first and the second step spacer molecules from the first step can be bound to the anchor molecules, and the spacer molecules have further functional groups for the covalent binding of further molecules, and in the second step the mediator molecules are immobilized on the implant material via the functional groups of the spacer molecules.

3. Method of claim 1 or claim 2, characterized in that at least a part of the chemical bonds of the mediator molecules to the surface of the implant material are modified such that the bonds can be cleaved under physiological conditions.

4. Method according to one of the previous claims, characterized in that the implant material is composed of a material chosen from the group of metals, metal alloys, ceramic materials or combinations thereof.

5. Method according to one of the previous claims, characterized in that biologically active substances such as bone growth factors from the class of the BMP-proteins, antibiotics or mixtures thereof are used as mediator molecules.

6. Method according to claims 5, characterized in that BMP-2 or BMP-7 is used as the bone growth factor.

7. Method according to one of the previous claims, characterized in that the surface of the implant material is provided with an oxide layer prior to the covalent binding of the anchor molecules.

8. Method according to claim 7, characterized in that the surface of the implant material, chosen from titanium, titanium alloys or stainless steel, is provided with an oxide layer by treatment with chromic-sulfuric acid over a time span of 0.5 up to 3 hours at 100 to 250°C prior to the covalent binding of the anchor molecules.

9. Method for the application of an oxide layer to metallic substrates, characterized in that the surface of the metallic substrate is treated with chromic-sulfuric acid over a time span of 0.5 up to 3 hours at 100 to 250°C.

10. Method according to claim 8 or 9, characterized in that the chromic-sulfuric acid has a density of more than 1.40 $g/cm^3$.

11. Method according to claim 2, 7 or 8, characterized in that in a first step anchor molecules are covalently bound to the implant surface, in a second step spacer molecules are covalently bound to the anchor molecules, wherein these spacer molecules reduce the nonspecific absorption of the mediator molecules, and in a third step the mediator molecules are covalently coupled to the spacer molecules.

12. Method according to claim 11, characterized in that in a first step aminoalkylsilane molecules are covalently bound to the implant surface, in a second step agarose molecules are covalently bound to the anchor molecules as spacer molecules, and in a third step BMP or ubiquitin are covalently coupled to the agarose as mediator molecules.

13. Implant, obtainable according to one of the claims 1-8, 11 or 12.

14. Implant according to claim 13, characterized in that the implant material is composed of titanium, titamium alloys, aluminium, stainless steel or hydroxylapatite.